Sweet Sugar

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

Prof.Chen is practicing baking cakes now. In the garden of his big house, there is an ingredient tree with n vertices, labeled by $1, 2, \ldots, n$. On the i-th vertex of the tree, there are c_i sweet sugars.

A cake will consume exactly k sweet sugars. Every time before baking a new cake, Prof.Chen will come to the garden, select a component (or the whole tree) of vertices from a tree, then cut the component down, and take all the sugars from it. When a component is cut down, the original tree may split into several disconnected new trees. Also, note that it is not a good idea to waste sugars, so Prof.Chen will always make sure there are exactly k sugars in the selected component.

Prof.Chen wants to make as many cakes as possible. Please help Prof.Chen to determine how many cakes he can make.

Input

The first line contains a single integer t ($1 \le t \le 10^6$), the number of test cases. For each test case:

The first line contains two integers n and k ($1 \le n \le 10^6$, $1 \le k \le 2 \cdot 10^6$), denoting the number of vertices and the number of sugars in each cake.

The next line contains n integers $c_1, c_2, \ldots, c_n$ ($0 \le c_i \le 2$), denoting the number of sweet sugars on each vertex.

Each of the following $n-1$ lines contains two integers u_i and v_i ($1 \le u_i, v_i \le n$, $u_i \ne v_i$), describing an undirected tree edge between the u_i-th vertex and the v_i-th vertex. It is guaranteed that the edges form a tree.

It is guaranteed that the sum of n over all test cases does not exceed 10^6.

Output

For each test case, output a single line containing an integer, denoting the maximum number of cakes that Prof.Chen can make.

Example

standard input	standard output
4	2
7 5	0
1 2 1 2 2 1 2	1
1 2	0
2 3	
3 4	
3 5	
5 6	
5 7	
2 2	
1 0	
1 2	
1 1	
1	
1 2	
1	